



**PATENT**  
Attorney Docket No. 400846/MELCO

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of:

TOYOSHIMA et al.

Application No. 09/738,855

Art Unit: 3729

Filed: December 18, 2000

Examiner: R. Chang

For: **METHOD OF PRODUCING A  
MULTI-LAYERED WIRING  
BOARD**

**RECEIVED**

**NOV 19 2002**

TECHNOLOGY CENTER R3700

**PENDING CLAIMS AFTER AMENDMENTS  
MADE IN RESPONSE TO OFFICE ACTION DATED SEPTEMBER 6, 2002**

1. A method of producing a multi-layered wiring board comprising:  
forming an insulating layer of a photosensitive resin on a substrate, and exposing and developing said insulating layer to form holes having respective sizes in said insulating layer;  
depositing a curable resin onto said insulating layer having the holes and filling the holes, and heating said curable resin to form a cured thin film of said curable resin at an interface of said insulating layer and said curable resin; and  
removing said curable resin, but not said cured thin film of said curable resin, leaving via-holes where the holes were made in said insulating layer, the via-holes being smaller in size than the holes due to said cured thin film remaining in the holes on said insulating film.
2. The method of producing a multi-layered wiring board according to claim 1, wherein said photosensitive resin is at least one member selected from the group consisting of an epoxy resin, an epoxy-modified acrylate resin, a cationic polymerization product of an epoxy resin, a phenol resin, a melamine resin, a carboxy-modified epoxy acrylate, and a cinnamate.
3. The method of producing a multi-layered wiring board according to claim 1, wherein said curable resin comprises one of a water-soluble resin and a water-soluble cross-linking agent.

4. The method of producing a multi-layered wiring board according to claim 1, wherein said curable resin is at least one member selected from the group consisting of polymethylsiliceous siloxane, a melamine resin, an acrylate resin, and an epoxy resin.
5. The method of producing a multi-layered wiring board according to claim 1, wherein said curable resin contains rubber particles consisting of a butadiene-acrylonitrile copolymer, and including chemically surface-roughening said cured thin film.
6. The method of producing a multi-layered wiring board according to claim 2, wherein said curable resin comprises one of a water-soluble resin and a water-soluble cross-linking agent.
7. The method of producing a multi-layered wiring board according to claim 2, wherein said curable resin is at least one member selected from the group consisting of polymethylsiliceous siloxane, a melamine resin, an acrylate resin, and an epoxy resin.
8. The method of producing a multi-layered wiring board according to claim 3, wherein said curable resin contains particles of one of calcium carbonate and polybutadiene rubber.
9. The method of producing a multi-layered wiring board according to claim 4, wherein said curable resin contains particles of one of calcium carbonate and polybutadiene rubber.
10. The method of producing a multi-layered wiring board including a plurality of stages of via-holes formed by repeating the process of claim 1, wherein the via-holes of later-formed stages are smaller in size than the via-holes of earlier formed stages.